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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,045	10/23/2003	Scott LaDell Vance	9314-52	6427

20792 7590 03/22/2005

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EXAMINER	
A, MINH D	

ART UNIT	PAPER NUMBER
2821	

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/692,045	VANCE ET AL.	
	Examiner	Art Unit	
	Minh D. A	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/03/04*, 11/03/04, 2/17/05
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-13, and 28-39 are rejected under 35 U.S.C. 102(b) as being unpatentable by Sawamura et al (US 6,535,170).

Regarding claim 1, Sawamura discloses a planar inverted F antenna configured for operation at an operating frequency band, the planar inverted F antenna comprising: first (12H) and second antenna segments (12L) wherein the first (2H) and second antenna (!2L) segments are separated by at least approximately 3 mm; a third antenna segment (mark by examiner (12I) coupling the first (12H) and second antenna (12L) segments; a reference voltage (14) coupling on the first antenna segment; and a feed (13) coupling on the first antenna segment (12H), wherein a current null is present between the feed and reference voltage couplings at the operating frequency band. See figures 3D-3F, col.6, lines 28-67 to col.9, lines 1-22.

Regarding claim 2, Sawamura discloses wherein the feed and reference voltage couplings are separated by at least approximately 15 mm. See figures 3D-3F.

Regarding claim 3, Sawamura discloses wherein the first and second antenna segments are rectilinear and parallel. See figures 1A-6D.

Regarding claim 4, Sawamura discloses wherein the third antenna segment is coupled to the first and second antenna segments at ends of the first and second antenna segments. See figures 1A-6A.

Regarding claim 5, Sawamura discloses wherein the feed coupling (13) is spaced apart from the third antenna segment by a greater distance than the reference voltage coupling (14). See figures 1a-1F.

Regarding claim 6, Sawamura discloses wherein the first and the third antenna segments define an angle of approximately 90 degrees. See figure 1A, col.7, lines 8-47.

Regarding claim 7, Sawamura discloses wherein the first antenna segment is longer than the second antenna segment. See figure 1A.

Regarding claim 8, Sawamura discloses wherein the operating frequency band is in the range of approximately 1700 MHz to 2500 MHz. See figures 6A-6D, col.9.lines 5-13.

Regarding claim 9, Sawamura discloses a printed circuit board (15 or 15A mark by examiner, see figure 3D) including a reference voltage conductor and an antenna feed conductor, the reference voltage coupling being electrically coupled to the reference voltage conductor of the printed circuit board and the feed coupling being electrically coupled to the antenna feed conductor. See figures 3D.

Regarding claim 10, Sawamura discloses wherein the reference voltage coupling is electrically coupled to the reference voltage conductor through an electrical short. See figures 3D-15F.

Regarding claim11, Sawamura discloses wherein the reference voltage coupling is electrically coupled to the reference voltage conductor through a non-zero impedance. See figures 3D-6D.

Regarding claim 12, Sawamura discloses wherein the operating frequency band comprises a high-frequency band, wherein the planar inverted F antenna is further configured for operation at a low-frequency band, wherein the current null is present between the feed and reference voltage couplings at the high - frequency band, and wherein the current null is not present between the feed and reference voltage couplings at the low-frequency band. See figures 3D-15F, col.7, lines 46-67 to col.12, lines 1-65.

Regarding claim 13, Sawamura discloses wherein the high frequency and is greater than 1700 MHz and wherein the low-frequency band is less than 1100 MHz. See figures 6A-6D, col.9.lines 5-13.

Regarding claim 28, Sawamura discloses an antenna comprising: a transceiver configured to transmit and/or receive radio communications at an operating frequency band, the transceiver providing a reference voltage and a transceiver feed; and a planar inverted F antenna configured for operation at the operating frequency band, the planar inverted F antenna including first and second antenna segments wherein the first and second antenna segments are separated by at least approximately 3 mm, a third antenna segment coupling the

first and second antenna segments, a reference voltage coupling on the :first antenna segment wherein the reference voltage coupling of the planar inverted F antenna is coupled to the reference voltage of the transceiver, and a feed coupling on the first antenna segment wherein the feed coupling of the planar inverted. F antenna is coupled to the transceiver feed and wherein a current null is present between the feed and reference voltage couplings at the operating frequency band. See figures 3D-3F, col.6, lines 28-67 to col.9, lines 1-22.

Regarding claim 29, Sawamura discloses wherein the feed and reference voltage couplings are separated by at least approximately 15 mm. See figures 3D-3F.

Regarding claim 30, Sawamura discloses wherein the first and second antenna segments are rectilinear and parallel. See figures 3D-3F.

Regarding claim 31, Sawamura discloses, wherein the third antenna segment is coupled to the first and second antenna segments at ends of the first and second antenna segments. See figures 3D-3F, element 12I as mark by examiner.

Regarding claim 32, Sawamura discloses wherein the feed coupling is spaced apart from the third antenna segment by a greater distance than the reference voltage coupling. See figures 3D-3F

Regarding claim 33, Sawamura discloses wherein the first and the third antenna segments define an angle of approximately 90 degrees. See figure 1A, col.7, lines 8-47.

Regarding claim 34, Sawamura discloses wherein the first antenna segment is longer than the second antenna segment. See figure 1A, col.7, lines 8-47.

Regarding claim 35, Sawamura discloses wherein the operating frequency band is in the range of approximately 1700 MHz to 2500 MHz. See figures 6A-6D, col.9.lines 5-13.

Regarding claim 36, Sawamura discloses a printed circuit board including a reference voltage conductor and an antenna feed conductor, the reference voltage coupling being electrically coupled to the reference voltage conductor of the printed circuit board and the feed coupling being electrically coupled to the antenna feed conductor. See figures 6A-6D, col.9.lines 5-13.

Regarding claim 37, Sawamura discloses wherein the reference voltage coupling is electrically coupled to the reference voltage conductor through an electrical short. See 6D.

Regarding claim 38, Sawamura discloses wherein the reference voltage coupling is electrically coupled to the reference voltage conductor through a non-zero impedance. See figures 3D-6D.

Regarding claim 39, Sawamura discloses wherein the operating frequency band comprises a high-frequency band, wherein the planar inverted F antenna is further configured for operation at a low-frequency band, wherein the current null is present between the feed and reference voltage couplings at the high frequency band, and wherein the current null is not present between the feed and

reference voltage couplings at the low-frequency band. See figures 3D-15F, col.7, lines 46-67 to col.12, lines 1-65.

3. Claims 14- are rejected under 35 U.S.C. 102(b) as being unpatentable by Boyle (2002/0130816A1).

Regarding claim 14, Boyle discloses an antenna arrangement comprising: a conductive antenna element (102), a feed coupling (106) on the conductive antenna element (102); and first (404) and second (404)reference voltage couplings on the conductive antenna element (102) wherein an electrical distance between the feed coupling and either of the first and second reference voltage couplings is greater than an electrical distance between the first and second reference voltage couplings. See figures 1-15, col.2, lines [0033] to col.3, lines [0051] to lines [0056].

Regarding claim 15, Boyle discloses wherein the planar inverted F antenna is configured for operation at an operating frequency band and wherein a current null is present on the conductive antenna element between the feed coupling and at least one of the reference voltage couplings at the operating frequency band. See figure 4.

Regarding claim 16, Boyle discloses wherein the operating frequency band is in the range of approximately 1700 MHz to 2500 MHz. See col.3, lines [0046] to lines [0047].

Regarding claim 17, Boyle discloses wherein the operating frequency band comprises a high-frequency band, wherein the planar inverted F antenna is further configured for operation at a low-frequency band, wherein the current null

is present at the high-frequency band, and wherein the current null is not present between the feed coupling and the at least one of the reference voltage couplings at the low-frequency band. See figures 4-15.

Regarding claim 18, Boyle discloses wherein the high frequency band is greater than 1700 MHz and wherein the low-frequency band is less than 1100 MHz. See figures 4-15.

Regarding claim 19, Boyle discloses an antenna comprising:
a printed circuit board including a reference voltage conductor and an antenna feed conductor, the first and second reference voltage couplings being electrically coupled to the reference voltage conductor of the printed circuit board, and the feed coupling being electrically coupled to the antenna feed conductor. See figures 4-15.

Regarding claim 20, Boyle discloses wherein at least one of the first and second reference voltage couplings is electrically coupled to the reference voltage conductor through an electrical short. See figures 4-15.

Regarding claim 21, Boyle discloses wherein at least one of the first and second reference voltage coupling is electrically coupled to the reference voltage conductor through a non-zero impedance. See figures 4-15.

Regarding claim 22, Boyle discloses wherein the feed coupling and at least one of the first and second reference voltage couplings are separated by an electrical distance of at least approximately 15 mm. See figures 4-15.

Regarding claim 26, Boyle discloses wherein the feed coupling is spaced apart from at least one of the first and second reference voltage couplings by an electrical distance of at least approximately 10 mm. See figure 4.

Regarding claim 40, Boyle discloses an antenna device comprising a transceiver configured to transmit and/or receive radio communications at an operating frequency band, the transceiver providing a reference voltage and a transceiver feed; and a planar inverted F antenna including a conductive antenna element, a feed coupling on the conductive antenna element wherein the feed coupling is coupled to the transceiver feed, and first and second reference voltage couplings on the conductive antenna element wherein the first and second reference voltage couplings are coupled to the reference voltage of the transceiver and wherein an electrical distance between the feed coupling and either of the first and second reference voltage couplings is greater than an electrical distance between the first and second reference voltage couplings. See figures 1-15, col.2, lines [0033] to col.3, lines [0051] to lines [0056].

Regarding claim 41, Boyle discloses the planar inverted F antenna is configured for operation at an operating frequency band and wherein a current null is present on the conductive antenna element between the feed coupling and -at least one of the reference voltage couplings at the operating frequency band. See figure 4.

Regarding claim 42, Boyle discloses wherein the operating frequency band is in the range of approximately 1700 MHz to 2500 MHz. See figures 3-14.

Regarding claim 43, Boyle discloses wherein the operating frequency band comprises a high-frequency band, wherein the planar inverted F antenna is further configured for operation at a low-frequency band, wherein the current null is present at the high-frequency band, and wherein the current null is not present between the feed coupling and the at least one of the reference voltage couplings at the low-frequency band. See figure 4.

Regarding claim 43, Boyle discloses a printed circuit board including a reference voltage conductor and an antenna feed conductor, the first and second reference voltage couplings being electrically coupled to the reference voltage conductor of the printed circuit board, and the feed coupling being electrically coupled to the antenna feed conductor. See figures 4-15.

Regarding claim 45, Boyle discloses wherein at least one of the first and second reference voltage couplings is electrically coupled to the reference voltage conductor through an electrical short. See figures 4-15.

Regarding claim 46, Boyle discloses wherein at least one of the first and second reference voltage coupling is electrically coupled to the reference voltage conductor through a non-zero impedance. See figures 4-15.

Regarding claim 47, Boyle discloses wherein the feed coupling and at least one of the first and second reference voltage couplings are separated by an electrical distance of at least approximately 15 mm. See figures 4-15.

Regarding claim 51, Boyle discloses wherein the feed coupling is spaced apart from at least one of the first and second reference voltage couplings by an electrical distance of at least approximately 10 mm. See figures 4-15.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 23-25, 27, 48-521 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Boyle (2002/0130816A1) in view Sawamura et al (US 6,535,170).

Regarding claims 23-25, 27, 48-521 and 52, Boyle does not teach wherein the conductive antenna element comprises, first and second antenna segments, wherein the first and second antenna segments are spaced apart, a third antenna segment coupled between the first and second antenna segments, and wherein the feed coupling and the first and second reference voltage couplings are on the first segment with the feed coupling being between the first and second reference voltage couplings. However, Sawamura discloses wherein the conductive antenna element comprises, first and second antenna segments, wherein the first and second antenna segments are spaced apart, a third antenna segment coupled between the first and second antenna segments, and wherein the feed coupling and the first and second reference voltage couplings are on the first segment with the feed coupling being between the first and second reference voltage couplings. See figures 3D-3F, col.6, lines 28-67 to col.9, lines 1-22.

It would have been an obvious to one of ordinary skill in the art at the time the invention was employ a lot of segments recited in claims such as that suggested by Sawamura in the an antenna device of Boyle to operate a first frequency and a second frequency, since these elements capable of conducting independent impedance adjustments for a different bandwidth and frequency.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Troelsen (US 6,646,610) and Scott et al. (US 6,738,023) are cited to show a PIFA structure for radio communication.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Minh A whose telephone number is (571) 272-1817. The examiner can normally be reached on M-F (5:30 –2:30 PM).

If attempts to reach the examiner by telephone is unsuccessful, the examiner's supervisor, Don Wong, can be reached on (571) 272-1834. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and (703) 872-9319 for final communications.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (571) 272-1553.

Examiner

Minh A

Art unit 2821

3/11/05

Hoanganh Le
Primary Examiner